and a critical examination of the herbarium material preserved in Singapore showed that it is not a new-comer to Penang, for it was collected by Mr. C. Curtis in that island at Pulau Tikus in 1893, and had been obtained previously in 1890 at Prai in Province Wellesley.

Cleome chelidonii occurs in India from the Santal hills, Orissa and Gujarat, southwards, as a weed by no means uncommon. It is found also in Java.

It is possible that it has reached Malaysia by the agency of man: but whether that be so or not, it must now be added to the lists of Malayan plants.

I. H. Burkill.

OBSERVATIONS ON THE EXPANSION OF DICTYOPHORA INDUSIATA, DESV.

Though there are excellent accounts of Phalloids from Ceylon and Java, so that probably nearly all the species are known, very few observations have been made in Malaya, and in the literature at the writer's disposal there is no detailed account of the expansion of *Dictyophora indusiata,* one of the commonest tropical species. Fischer, in his account of the group in Engler's *Pflanzenfamilien* (Teil I, Abt. 1** p. 278), records that the maximum rate of expansion observed was 5mm. in a minute (in Brazil); C. G. Lloyd (*Synopsis of the known Phalloids,* Cincinnati 1909) records an observation of 4 cm. in a minute. The present writer recently had the opportunity of observing the expansion of this species, and the notes made appear to be worth placing on record.

Petch (*Ann. R. Bot. Gard. Peradeniya* Vol. IV pp. 145-151) states that at Peradeniya he could always find specimens fully expanded with the veil still rigid between 8 and 9 a.m., and suggests that expansion probably takes place about 6 a.m., the time of maximum humidity there. Möller in Brazil found expansion to occur between 2 and 7 a.m. In Singapore the time would appear to be as in Ceylon, or occasionally even later. On one occasion fully expanded specimens were found at 8 a.m. but those on which the observations here recorded were made expanded between 8 and 9 a.m.

On May 30th at about 8.15 a.m. my attention was called to three specimens growing on bare ground in a shady place near the Gardens Office. Their condition at this time was as follows:

A. Stalk elongated but veil not yet expanded, the edge just beginning to free itself below the cap.

B. A smaller specimen, in a slightly earlier stage of development, the veil completely hidden by the cap.

C. An unbroken egg.

These were brought into the laboratory and supported in earth under a bell glass. During this operation the edge of the veil of A continued to expand, even though for a few minutes it was lying on the bench. The early stages of expansion were observed in the specimen C, and the later stages in A. and B. C did not properly complete its development. The complete history given in the following paragraph was therefore not observed in a single individual.

After the egg had broken at the apex, the splitting of the volva continued slowly. After about 20 minutes the cap was protruding slightly and the egg was split nearly to the base. Then suddenly the stalk began to expand, growing to a length of about 10 cm. in about 15 seconds. Unfortunately the observer had no time to make an accurate measurement of the time taken in this process, which was exceedingly rapid. Extension continued gradually till about 30 minutes later the total length was about 15 cm. During this period the edge of the veil began to expand slightly from underneath the cap, extending downwards at most 5 cm. Specimen C did not expand beyond this point, the inner surface of the cap not freeing itself properly from the folded veil. In specimens A and B, when the edge of the veil had slightly unfolded, the cap began to move, owing to the further extension of the portion of the stalk above the point of attachment of the veil (hidden by the cap). This extension was from 2 to 3 cm. and in specimen B was complete in two minutes. The extension was accompanied by slight movements of rotation, as if the cap were consciously wriggling to set itself free from the veil. When the extension was complete the folded mass of the veil was completely exposed, and began at once to expand. The unfolding process occupied about 20 minutes in both A and B, the veil reaching down quite to the surface of the soil in which the bases of the eggs were embedded. The total time of expansion was therefore about 70 minutes, possibly as much as 90 minutes, from the breaking of the egg to the complete unfolding of the veil.

The gleba was quite dry when the cap first appeared, and gradually became viscid during the course of expansion. At the same time the veil beneath the cap gradually became separated from it. In specimen C it was observed that in those parts where the under surface of the cap remained adhering to the veil the gleba on the upper surface failed to liquefy; possibly the same source which provides water for the liquefaction of the gleba also causes a wetting and consequent lubrication of the surfaces of contact of the veil and cap, allowing of their separation.

The exceedingly rapid expansion of the fructification is made possible by the mesh structure of the wall of the hollow stalk; the process must be regarded as in the nature of the expansion of a spring which has been placed under pressure and then released. The pressure is presumably due to the turgidity of the cells of the stalk and veil. It is obvious that no further water can be supplied to these cells during the process of expansion, and it is therefore essential that expansion should take place rapidly and in a humid atmosphere. Under the bell jar the veils remained fairly rigid for three or four hours, and the stalks for 24 hours.

R. E. HOLTTUM.

MOSQUITO LARVAE IN THE PITCHERS OF NEPENTHES.

In the *Journal of the Straits Branch, R. Asiatic Society,* No. 22 p. 430 (1890) Mr. H. N. Ridley published a note stating that he had observed mosquito larvae in the pitchers of *Nepenthes ampullaria* growing in the Gardens Jungle, and that he had reared some of these to maturity in the pitcher. This was probably the first record of such an occurrence. The fact was subsequently confirmed by Mr. Percy Groom (*Annals of Botany* Vol. 7. p. 231). The presence of digestive enzymes in the water contained in the pitchers makes it remarkable that the larvae are able to develop to maturity in such a medium. It is perhaps noteworthy that the pitchers of *N. ampullaria* have a small lid which is bent back, so that more rain water is able to enter than into the pitchers of some other species; this additional water would cause a dilution of the enzymes present. However, Mr. Burkill has observed on Penang Hill that mosquito larvae are easily found in the large lidded pitchers of *Nepenthes albomarginata.* In the paper quoted in the next paragraph there is no reference to the species of Nepenthes concerned.

Since Mr. Ridley's observation there have been numerous similar records, and in a recent number of the *Bulletin of Entomological Research* (Vol. 14 pt. 1 pp. 1-2) Mr. F. W. Edwards gives a list of species of mosquitos which have been found breeding in Nepenthes pitchers in the Oriental Region. Most of the records are from the Malay Peninsula and the total number of species is sixteen. A new record in this paper is the collection of *Megarhinus metallicus* in Nepenthes pitchers on Cameron's Highlands by Dr. H. P. Hacker.

R. E. HOLTTUM.

THE FLORAS OF THE MALAY PENINSULA, BORNEO AND THE PHILIPPINE ISLANDS.

Volumes 1, 2 and 3 of Mr. H. N. Ridley's *Flora of the Malay Peninsula* (London, 1922—1924) have appeared, and volumes 2 and 3 of Mr. E. D. Merrill's *Enumeration of Philippine Flowering Plants* (Manila, 1923). Further the latter's *Bibliographic Index of Bornean plants* (Journal of the Straits Branch of the Royal Asiatic Society, special number, 1921) is available. With these